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Review of Approaches to Diagnosis of Post-Traumatic Stress Disorders

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Abstract. *Many doctors of various specialties throughout Ukraine meet internally displaced persons and combatants from the eastern regions of Ukraine among their patients. Given that such events are taking place on the territory of Ukraine for the first time in all the years of independence, they are unusual, atypical, such that they go beyond the ordinary. This, in turn, has a significant impact on the mental life of Ukrainians - both those in areas where the confrontation continues, and those who lead a peaceful life.*

Keywords. *Post-traumatic stress disorder; psychological shock; analytical research methods; stress; physiological indicators.*

I. Introduction and Problem Statement

The purpose of this work is to summarize information about post-traumatic stress disorder and describe approaches to its diagnosis, because today it is increasingly common in Ukrainians who have experienced traumatic events.

The pathogenic role of difficult experiences, moral upheavals in the development of mental disorders has been known since ancient times. In the occurrence of some diseases, stress can play the role of a trigger, in others - to influence their clinical manifestations, in others - to be the basis for the development of mental pathology. In addition, mental trauma can lead to the pathological formation of personality, determining its entire subsequent life path. In all varieties of each of these options, clinical symptoms are an integral reflection of the interaction of a complex of external and internal conditions [1]

Post-traumatic stress disorder (PTSD) develops in people of any age after a stressful situation or event of a threatening or catastrophic nature. About 25-30% of people who have suffered a traumatic event may experience PTSD.

Military traumatic stress is a type of PTSD. It occurs in direct participants in hostilities. The formation of military-traumatic stress is facilitated by certain conditions:

1. A sharp change in the conditions of peaceful civilian life in combat, to which it is necessary to adapt quickly. In such conditions, a person is constantly in danger, witnessing destruction, fires, deaths (both acquaintances and strangers). Some researchers use this term to refer to reactions that occur under such circumstances.

2. A sharp change in the situation of hostilities for peace. The military needs to adapt to this situation again. The maladaptations that occur during this period are distinguished by their duration and are called PTSD proper. Returning to a normal peaceful life as a result of the end of hostilities or as a result of demobilization, a person often remains adapted to the situation of hostilities.

II. Diagnosis of This Problem

Post-traumatic stress disorder is diagnosed on the basis of patients' complaints of psychological trauma, tragic divisions in the past. Diagnosis of PTSD is provided by special questionnaires that confirm the conditions necessary for use.

To obtain the best and complete information about the state of the biological system, it is necessary to investigate a set of medical, biological and psychological-personal indicators. The main support for solving this problem is to find the best optimal method for determining the level of emotional stress, taking into account the emergence of a complex of biological, medical, technical and psychological compounds that use the general function of determining the physiological parameters of the biological object [2].

III. Basic Research Methods

The main methods of physiological research are based on registration of parameters of human life, which include: mechanical manifestations (mechanocardiography); electrical conductivity of biostructures (rheography); electrical activity (electrography); optical properties (optical plethysmography, photoplethysmography, etc.); heat production and heat transfer processes (thermometry, biocolorimetry).

With the help of analytical research methods, quantitative parameters are calculated that characterize the state of the biosystem, the concentration of components based on biological samples. These include all types of laboratory tests and analyzes (colorimetry, etc.). Physiological and physicochemical parameters that indicate the presence of emotional stress can be determined using several methods:

1. By means of mechanical measurements the speed and acceleration of a blood-groove which at emotional pressure considerably increase are defined; changes in blood pressure; vibration, etc.

2. The purpose of electrical measurements is the study of electrical biopotentials.

3. Measurement of optical parameters of the test substance is carried out by colorimetric, spectral, photometric and polarimetric methods.

4. With the help of physico-chemical studies determine the quantitative and qualitative indicators of blood composition, their changes caused by the presence of emotional stress.

5. Test methods are to determine the psychopersonal indicators of human health.

6. Common research methods are used when it is necessary to simultaneously determine two or more values to find the relationship between them (measuring blood pressure in blood vessels and blood flow velocity, etc.) [3].

In today's world, this disease can be diagnosed using diagnostic equipment.

Medical diagnostic devices play a significant role in diagnostic equipment, providing medical staff with

information about individual physiological parameters of the patient: blood pressure parameters, heart rate and respiration, etc. Electromyographic (EMG) measurements of the stress response include an assessment of the effect of the stress response on the striated muscles. Electromyographic measurement is an indirect determination of muscle tension that measures the electrochemical activity of the nerves that innervate a striated muscle. The activity of the striated muscles is considered as an indicator of stress response.

The practical advantage of using EMG to record a stress response is the availability to measure muscle groups. The method of encephalographic diagnosis of nervous system lability is the most effective for studying the course of emotional stress. The main hemodynamic criteria for assessing emotional stress are peripheral blood flow (PC) and heart rate (HR). PC is determined using the method of plethysmography, which aims to assess the volume of blood circulating in the studied anatomical area. The objects of plethysmographic measurements are the fingers and toes, shins and forearms, with a stress response, the volume of blood in these areas decreases. This phenomenon is considered as a consequence of direct nerve impulses, which causes the effect of narrowing of blood vessels.

Currently, there are a number of ways and devices in which attempts are made to measure emotional stress. One way is thermography with the help of an indicator card, which uses the properties of liquid crystals depending on the temperature to measure the color, which determines the level of stress. However, the temperature of the fingers in which the card is clamped depends on many side effects that have nothing to do with stress and therefore do not allow to judge it objectively. Heart rate is determined by optical plethysmography or electrocardiography (ECG). When determining the parameters of blood pressure, namely, systolic PS and diastolic Pd, impedance plethysmography allows to obtain a curve of change in resistance of the human body, or the so-called rheogram. The rheographic method of measuring blood pressure parameters is a relatively new direction in assessing the quality of functioning of the human cardiovascular system. It is characterized by such major shortcomings as a significant methodological error of 20-30%, inconveniences and undesirable consequences of using an occlusive cuff. The reason for the large methodological error in determining the values of PS and Pd is the imposition on the rheogram of wave processes of the second and third orders, due to the work of other human organs, including the lungs and liver. Impedance plethysmography (rheography) is used to determine such hemodynamic parameters as minute stroke volume of blood, the speed of blood circulation in the artery, the speed of propagation of the pulsating wave, as well as the parameters of human blood pressure [4].

In such conditions, the task of filtering the pulse curve to obtain a rheogram that is adequate to the dynamics of blood pressure measurement becomes relevant. Electrodermal methods for measuring stress response include the assessment of the effect of stress on the electrical characteristics of the skin. The method of measuring the stress response is based on the effect of skin galvanic resistance (SCR), which is characterized by the use of a weak electric current between two electrodes on the skin surface. In this system, the skin functions as an electrical resistance. The method of measuring skin potential (SK) is based on measuring the skin's own bioelectrical activity. SP is characterized by a short time interval between the stimulus and the electrical response of the skin. The average interval for SHGO is 2-3 s. When using SHP this interval in most cases is reduced by half [5].

IV. CONCLUSIONS

Considering existing approaches to diagnosing post-traumatic stress disorder, we can conclude that if we successfully combine existing approaches to diagnosis and collect enough informative indicators, we can get more accurate results than using only one method of diagnosis. Careful selection of combinations of methods and approaches gives a quick and effective implementation of the system for diagnosing post-traumatic stress disorders.

REFERENCES

[1] Fattakhov VV, Demchenkova GZ, Maksumova NV Medico social and psychological aspects of quality creature of life and health of combat veterans. ID МеДДоК. - Kazan, 2014. - 212 p.

[2] Tsikhonya V. Memo about post-traumatic stress disorder / V. Tsikhonya // Art of treatment. - 2014. - № 7/8.

[3] Panchenko O.A. Social stress disorders: civilians in

[4] the epicenter of hostilities / O. A. Panchenko. I.I. Kutko, N.A. Hare VA // News of medicine and pharmacy in Ukraine. - 2014. - №. 15 – 509 p.

[5] Dammann G. Posttraumatic stress disorder – challenging a mechanistic neuropsychological and monocausal etiological model // Український вісник психоневрології. – 2015. – Т. 23. – Вип. 3 (84). – Р. 8–15

[6] Odintsova, MA Psychology of stress: textbook and workshop for universities / MA Odintsov, NL Zakharova. - M.: Yurayt, 2018 .- 299 p.